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Pesticide Fact Sheet Number 3.1: Ethoprop

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

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Office of Pesticide Programs (TS-768C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: ETHOPROP
Reason for Issuance: Registration Standard Amendment-Classification for restricted use
Date Issued: 2/1/85
Fact Sheet Number: 3.1

1. Description of chemical:

Generic name: 0-ethyl S,S-dipropyl phosphorodithioate
Common name: ethoprop
Trade name: Mocap®
EPA Shaughnessy code: 041101
Chemical Abstracts Service (CAS) number: 13194-84-4
Year of initial registration: 1967
Pesticide type: soil insecticide-nematicide
Chemical family: organophosphate
U.S. and foreign producers: Rhone-Poulene, Inc.

2. Use patterns and formulations:

Application sites: registered for use on a variety of tropical fruits, vegetables, ornamentals, field crops, commercial turf, and home lawns.
Types of formulations: granulars, emulsifiable concentrates.
Types and methods of application: applied as a soil incorporated, broadcast, or band treatment, as a root dip treatment for citrus and certain ornamentals. Ethoprop formulations are commonly applied by using ground equipment and are incorporated into the soil immediately after application with the use of cultivating equipment and/or by irrigation. Also, spray equipment (i.e., backpack sprayers) and watering cans may be used for application.
Application rates: vary according to formulation and crop.
Usual carriers: Confidential Business Information

3. Science findings:

Summary science statement:

Adequate studies are available to assess the acute toxicological hazards of technical ethoprop. No toxicological hazards of concern were identified. Available studies indicate that ethoprop is very toxic to birds, marine/estuarine crustaceans and fish species. It is moderately toxic to coldwater fish species and moderately toxic to honeybees.

Although a full tolerance and risk assessment cannot be completed due to a number of data gaps, there is no evidence

to suggest that current tolerances are likely to expose the public to unreasonable adverse effects.

Chemical characteristics:

Ethoprop is a clear yellow-tinted liquid with a strong mercaptan odor. The empirical formula is $C_8H_{19}O_2PS_2$ and the molecular weight is 242.307. The boiling point is 86-91°C at 0.2 mmHg. Ethoprop is soluble in water to 750 ppm and soluble in most organic solvents.

Toxicological characteristics:

Currently available toxicology studies on ethoprop are as follows:

- Oral LD_{50} in rats: 56.2 mg/kg for males and 30.2 mk/kg for females.
- Dermal LD_{50} in rabbits: 23.7 ul/kg
- Primary dermal irritation: Unknown since death prevented manifestation of a skin irritation response.
- Primary eye irritation: Unknown since all rabbits died within 1 hr of administration. Substance is too toxic to determine an eye irritation potential.
- Inhalation LC_{50}: 0.123 mg/liter
- Acute delayed neurotoxicity: Hens treated with ethoprop were not shown to produce signs of delayed neurotoxicity.
- Teratology in rats: Maternal NOEL=1.6 mg/kg; terata NOEL=1.6 mk/kg
- 90-day dog feeding study: Systemic NOEL=100 ppm at the highest dose tested; cholinesterase NOEL=1 ppm.

Adequate studies are available to assess the acute toxicological effects of technical ethoprop. No toxicological hazards of concern have been identified in the studies reviewed for the Standard.

Physiological and biochemical behavioral characteristics:

Metabolism and persistence in plants and animals: ethoprop in bean and corn plants is metabolized by hydrolysis following uptake from the soil. The metabolites identified are ethyl propyl sulfide, propyl disulfide, ethyl propyl sulfoxide and water soluble high-boiling phosphoric acids and/or their salts. The only residue of toxicological concern is the parent compound.

There are no data to indicate how ethoprop is metabolized or excreted by animals. In one feeding study in which dogs were fed unlabeled ethoprop for 21 days at rates

up to 2.3 ppm of their diet, no detectable residues (i.e. >0.01 ppm) were found in their tissues. Because feed items with established negligible residue tolerances (<0.02 ppm) are expected to have little, if any, ethoprop residues, it is concluded that the metabolism in animals, although not completely known, is at this time sufficiently detailed.

Environmental characteristics:

Ethoprop is not expected to contaminate drinking water supplies. It degrades fairly rapidly with half-lives of 3-56 days in soil. Increase in soil temperature tends to increase the dissipation rate. However, ethoprop is very mobile in sandy soil and has a potential for contaminating groundwater in areas of sandy soil with a high water table. Because of this, soil dissipation study monitoring may, depending on the leaching data, have to be conducted at a depth greater than 6 inches.

Ecological characteristics:

Based on studies available to assess hazards to wildlife and aquatic organisms, ethoprop is characterized as very highly toxic to birds, marine/estuarine crustaceans, and marine/estuarine fish species. It is moderately to highly toxic to coldwater fish species and moderately toxic to honey bees.

Results of currently available studies are as follows:

- avian oral LD_{50}: ranges from 4.21 - 61 mg/kg.
- avian dietary LC_{50}: ranges from 33 - 118 ppm in upland gamebirds and 287 - 550 ppm in waterfowl.
- fish LC_{50}: ranges from 1.02 mg/l - 1.85 mg/l in rainbow trout.
- aquatic invertebrate LC_{50}: ranges from 13 ug/l - 25.3 ug/l.

Tolerance assessment:

Tolerances are established for negligible residues of the insecticide nematicide ethoprop in or on the following raw agricultural commodities: bananas, cabbage, corn-grain, corn fodder and forage, cucumbers, fresh corn including sweet corn (kernels plus cob with husk removed), lima beans, lima bean forage, peanuts, peanut hay, pineapples, pineapple fodder and forage, soybeans, soybean forage and hay, sugarcane, sugarcane fodder and forage, and sweet potatoes at 0.02 parts per million. These tolerances are published in 40 CFR 180.262. There are no international

tolerances nor Codex Maximum Residue Limits (MRLs) for residues of ethoprop.

Tolerances for most raw agricultural commodities (with the exception of potatoes and tobacco) are supported by currently available residue data. However, the Agency is unable to complete a tolerance reassessment because of residue chemistry and toxicology data gaps.

A provisional acceptable daily intake (PADI) is calculated to be 0.000075 mg/kg/day, the provisional maximum permissible daily intake (PMDI) is 0.0045 mg/day and the theoretical maximum residue concentration (TMRC) is 0.0052 mg/day for a 1.5 kg diet. The percent of the PADI utilized is 115.02%. Although the PADI has been exceeded, it is concluded that exceeding the PADI does not necessarily in and of itself represent an immediate hazard to the public. The actual levels of residues to which the public is exposed are likely to be considerable less than this theoretical maximum would indicate for some of the following reasons:

- Not every crop for which a tolerance has been established has been treated with the pesticide.
- Most treated crops have residue levels which are below the established tolerance level.
- Processing or time to market often result in further residue reductions.
- Preparing food for consumption often results in residue reductions.
- Not all crops contributing to the TMRC (PADI) are likely to be consumed by an individual.
- Market basket surveys conducted by FDA indicate that little if any real pesticide residues of organophosphates actually remain in/on finished foods.

After review of the requested toxicology data, the ADI will be reevaluated.

4. Summary of regulatory position and rationale:

The "Restricted Use" classification for all ethoprop emulsifiable concentrate formulations containing 40% and greater will continue. Granular end-use products containing 10% or more ethoprop with disulfoton 5% and greater are classified for "Restricted Use". All other granular and/or fertilizer end-use products containing ethoprop are

also classified "Restricted-Use", however, registrants of these products have the option of accepting the restricted-use classification, or submitting data to show that the the product does not warrant this restriction. All such products released for shipment on September 1, 1985, or thereafter, must be labeled for restricted use. Similarly, all such products which are in channels of trade on or after September 1, 1986 must bear restricted use labeling.

Although the Agency is unable to complete a tolerance reassessment because of certain residue chemistry and toxicology data gaps, the Agency concludes that no change in present tolerances are indicated at this time. Further, although the provisional acceptable daily intake has been exceeded, future requests for tolerances will not be automatically rejected on this basis.

No federal or state reentry intervals have been established for ethoprop. There is no need to establish any reentry intervals, since the practice of soil incorporation is expected to minimize exposure during reentry operations. This is also true for turf areas where the pesticide is watered-in.

The Agency has identified a potential avian adverse effect concern. Based on acceptable subacute dietary studies, it is calculated that the expected residues on avian food-stuffs following a single application of ethoprop at a rate of 6 pounds a.i. per acre (maximum registered corn rate) exceed the subacute dietary LC_{50} level in avian species. In order to determine whether significant evidence relating to this adverse effect would raise prudent concerns of unreasonable adverse risk to man or the environment, the Agency is requiring additional avian field testing data.

The following additional human hazard statement must appear on all manufacturing-use product labels:

> "Poisonous if absorbed through the eye.
> Do not get in eyes."

Although a full tolerance reassessment and risk assessment cannot be completed, there is no evidence to suggest that current tolerances are likely to expose the public to unreasonable adverse effects.

5. Summary of major data gaps:

- 90-day feeding; rodent, non-rodent
- 21-day dermal
- chronic toxicity; 2 species
- oncogenicity study; 2 species
- teratogenicity; 1 species
- reproduction; 2 species
- mutagenicity testing; gene mutation, chromosomal aberration, other mechanisms of mutagenicity
- general metabolism
- hydrolysis study
- photodegradation study; in water
- aerobic and anaerobic soil study
- leaching and adsorption/desorption study
- field soil dissipation study
- accumulation studies; rotational crops and fish
- data on residues in potatoes and tobacco
- 2 acute field studies,
- freshwater fish LC_{50}
- acute LC_{50} freshwater invertebrates

All studies are to be submitted to the Agency by June, 1986.

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